

and thereafter, electrodes arranged at second edges orthogonal to the first edges are supplied with the same voltage.

[0030] In order to allow operating a user interface with touch sensing, embodiments provide the first and second conductive layers as transparent layers. The transparent layers may be positioned in front of a display, such as a LCD or OLED display, or LED display, or plasma display, or any other display.

[0031] The conductive layers have to be such, that they do not short-circuit the electrodes arranged on the layers. Thus, the conductive layers may have a low resistance. Also, it is possible that the conductive layers are totally conductive for capacitive touch sensing. Capacitive touch detection may work with resistances higher than 90 kOhm per square. Also, the layers may have a resistance of between 1-90 kOhm per square. The resistance of the layers may be different from each other. This may be provided, according to embodiments, by Indium-Tin-Oxide (ITO) or Antimony-Tin-Oxide (ATO) or similar materials, from which the first and second conductive layers are made. The conductive layers may be films as well more rigid materials, such as glass, i.e. ITO coated glass.

[0032] Capacitive touch sensing requires a conductive piece, for example a finger, to come into close proximity of or in contact with the first conductive layer. For example, the first conductive layer may be arranged on top of the second conductive layer, thus improving capacitive touch sensing.

[0033] In order to allow good resistive touch sensing, it is necessary that the first and second conductive layers come into physical contact with each other, when pressure is applied on the layers. In order to allow the first conductive layer to be pressed onto the second conductive layer easily, embodiments provide the first conductive layer as a flexible layer.

[0034] In order to avoid the second conductive layer to be displaced relative to the first conductive layer, embodiments provide the second conductive layer as a stable layer. A stable layer may be a layer with a hard surface.

[0035] Another aspect of the application is a touch sensitive display panel comprising an apparatus with a first conductive layer with first and second electrodes, a second conductive layer with third electrodes, a spacer spatially spacing the first conductive layer from the second conductive layer, the first electrodes being arranged at least for capacitive touch detection, the second and third electrodes being arranged for resistive touch detection.

[0036] A further aspect of the application is a mobile multimedia device comprising a memory, a processor, a display, and an apparatus with a first conductive layer with first and second electrodes, a second conductive layer with third electrodes, a spacer spatially spacing the first conductive layer from the second conductive layer, the first electrodes being arranged at least for capacitive touch detection, the second and third electrodes being arranged for resistive touch detection.

[0037] A further aspect of the application is a method comprising applying a first potential onto a first conductive layer comprising first electrodes, applying a second potential onto a second conductive layer comprising third electrodes, providing capacitive touch detection using the first electrodes on the first conductive layer, and providing resistive touch detection using at least second electrodes arranged on the first conductive layer for sensing contact between the first and the second conductive layer.

[0038] Capacitive touch sensing provides for good results, when a conductive layer which is used for capacitive touch sensing is provided with an equal potential throughout its surface. Therefore, embodiments provide applying the first conductive layer with an electrostatic potential.

[0039] Resistive touch sensing requires measuring the point of contact between the layers in at least two directions. For this reason, embodiments provide applying a changing or pulsating potential onto the second conductive layer. This changing potential may provide field lines, which are subsequently orthogonal to each other. The field lines may first be substantially in a y-direction, and thereafter substantially in an x-direction, orthogonal to the y-direction. Other directions of field line are also within the scope of the application, as long as the direction of field lines allows for determining the coordinates of a point of contact between the conductive layers.

[0040] Embodiments provide that the potential applied to the second conductive layer changes the direction of field lines of the electrical field on the second conductive layer, such that first field lines are substantially orthogonal to temporally following second field lines.

[0041] For example, when the apparatus is used in a multimedia device, a mobile phone, or the like, the user interface may be deactivated, when the device is not used. Upon sensing a current change due to moving a conductive piece into the proximity of the first conductive layer, the user interface may be activated, according to embodiments. Thus, when the user moves his finger in the proximity of the displayed panel, the user interface may be activated.

[0042] Browsing through content displayed on the user interface may only require approximation of the position of the point of contact. Browsing through a user interface may be done using the first conductive layer with capacitive touch sensing only. Even though the position detection is less accurate than with resistive touch detection the capacitive touch sensing does not require any force applied onto the surface, resulting in easy navigation through menus.

[0043] Upon actually pressing the first conductive layer onto the second conductive layer, a user might want to select certain content displayed on the user interface. For selecting the content, exact position detection may be necessary in order to avoid wrongful selection. Embodiments provide activating resistive touch detection when the first and the second conductive layers are brought into contact by pressing the layer onto the second conductive layer. Further, by sensing the absolute value of the current through the second electrode on the first conductive layer, it may be determined at which force the two conductive layers are pressed together. The amount of current may be proportional to the size of point of contact. The higher the force pressing the layers together, the larger the point of contact and the larger the current within the second electrode may be.

[0044] When the resistive touch detection is activated, capacitive touch detection may be deactivated. For this reason, embodiments provide for switching of the voltage applied to the first conductive layer upon sensing the voltage applied from the second conductive layer onto the first conductive layer, i.e. sensing a current within the second electrode. This current is sensed, when the first conductive layer is brought into contact with the second conductive layer.

[0045] It may also be possible that resistive touch detection is activated per default. In this configuration, it may only be checked whether the layers are pressed together and then the